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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/773,868 | 02/06/2004 | Rashid Mavliev | 008343-540001 | 7212 |

7590 09/01/2005

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| EXAMINER |
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WILKINS III, HARRY D

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| ART UNIT | PAPER NUMBER |
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1742

DATE MAILED: 09/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/773,868

Applicant(s)

MAVLIEV ET AL.

Examiner

Harry D. Wilkins, III

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-74 is/are pending in the application.
- 4a) Of the above claim(s) 1-15 and 31-74 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/28/04, 4/11/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's previous election without traverse of group II (claims 16-45) in the reply filed on 15 April 2005 is acknowledged.
2. Applicant's election without traverse of group I (claims 16-30) in the reply filed on 13 July 2005 is acknowledged. Please note that the election contained a typographical error in that group I was claims 16-30, not claims 16-31.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 16-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ashjaee et al (US 6,482,307) in view of Johansson et al (US 2002/0077031).

Ashjaee et al teach (see abstract, figures 3-5 and associated description) an ECMP apparatus including a rotatable platen (9) to support a polishing pad, a weir (9c) to contain an electrolyte on the polishing pad, a carrier head (10) to hold a substrate (16) against the polishing pad, a first electrical contact for connection to a first electrode for contacting the polishing electrolyte on the polishing pad, a second electrical contact for connection to second electrode for contacting the substrate in contact with the polishing pad, a voltage source to apply a voltage between the first electrical contact and the second electrical contact.

Thus, Ashjaee et al fail to teach an eddy current sensor secured to the platen including a coil to generate a magnetic field to induce eddy currents in a metal layer in the substrate while the sensor is positioned adjacent the substrate.

Johansson et al teach (see figure 2A-7D) an eddy current sensor for a CMP apparatus that was attached to the platen and included a coil to generate a magnetic field to induce eddy currents in a metal layer in the substrate while the sensor is positioned adjacent the substrate.

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the eddy current sensor of Johansson et al in the device of Ashjaee et al because the eddy current sensor of Johansson et al was able to detect changes in the thickness of a conductive film on the surface of a semiconductor wafer, thereby detecting when the proper amount of polishing had been performed (i.e.-indicating an end point of the polishing process).

Regarding claims 17-19, the eddy current sensor of Johansson et al was located in a housing in a cavity in the platen and the housing had a projection that extended above the top surface of the platen (see figures 4B or 4C).

Regarding claim 20, the eddy current sensor included (see figure 6) a core at least a portion of which is positioned in the projection above the top surface of the platen.

Regarding claim 21, the apparatus of both Ashjaee et al and Johansson et al included a polishing pad positioned on the platen. Johansson et al teach (see figure 4C) that the polishing pad included an aperture aligned with the sensor.

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Regarding claim 22, Johansson et al teach (see figure 4C) that the housing extended partially into the aperture.

Regarding claims 23 and 24, although not expressly disclosed by Johansson et al, since the eddy current sensor would have been adversely affected by the electrolyte, it would have been obvious to one of ordinary skill in the art to have provided a conventional sealing means, such as an o-ring, to isolate the sensor from the electrolyte.

Regarding claims 25 and 26, Ashjaee et al teach (see figure 5 and col. 4, lines 34-59) a pad to contact the wafer included an upper layer biased to provide the proper current to the substrate (i.e.-the second electrical contact of the present invention) and a lower layer biased to provide the proper current to the electrolyte (i.e.-the first electrical contact of the present invention). The second electrode would have been required to contain an aperture above the eddy current sensor so that the second electrode did not effect the measurement of the metal layer on the substrate. The eddy current sensor would have been placed as close to the surface as possible, such that it was located at least partially in the aperture of the second electrode.

Regarding claims 27-29, Ashjaee et al teach (see figure 3) the first electrode (30). The first electrode would have been required to contain an aperture around the eddy current sensor so that the eddy current sensor could have been placed as close to the surface as possible. As such it would have been obvious to have located the eddy current sensor at least partially in the aperture of the first electrode. The first electrode was located between the platen (32) and the non-conductive polishing layer (8).

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Regarding claim 30, it would have been obvious to one of ordinary skill in the art to have added multiple eddy current sensors to the apparatus of Chen et al because the wafer substrate in Chen et al was much smaller than the platen, and hence, multiple sensors would have been required to be used to ensure multiple sensing locations across the entire platen surface. It would have been obvious to arrange the sensors at any location along the surface of the platen, such as equal radial distances from the center and at regular angular intervals. The eddy current sensor of Johansson et al included a coil to generate a magnetic field to induce eddy currents in a metal layer in the substrate while the sensor is positioned adjacent the substrate.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Harry D Wilkins, III
Examiner
Art Unit 1742

hdw